

CLAIMS

What is claimed is:

- 1 1. A method for simultaneously planarizing to relatively equal smoothness a thin
2 film magnetic head hardbaked resist structure having relatively low surface energy and one or
3 more additional thin film magnetic head structures containing other materials of comparatively
4 higher surface energy, said method comprising the steps of:
5 preparing a chemical mechanical polishing (CMP) slurry targeted at equaling the rate of
6 removal of said hardbaked resist structure having relatively low surface energy and said one or
7 more additional structures containing other materials of comparatively higher surface energy;
8 said CMP slurry including a liquid vehicle containing an oxidant and a complexing agent,
9 an abrasive, and a surfactant; and
10 applying said CMP slurry to the surface of said structures and simultaneously planarizing
11 said structures using a CMP planarization technique.
- 1 2. A method in accordance with Claim 1 wherein said other materials include
2 copper, alumina and NiFe.
- 1 3. A method in accordance with Claim 1 wherein said surfactant comprises a non-
2 ionic surfactant.
- 1 4. A method in accordance with Claim 1 wherein said surfactant comprises
2 octylphenoxypolyethoxyethanol.

1 5. A method in accordance with Claim 1 wherein said abrasive comprises silica.

1 6. A method in accordance with Claim 1 wherein said liquid vehicle comprises
2 water, said oxidant and said complexing agent.

1 7. A method in accordance with Claim 1 wherein said oxidant comprises
2 persulfate .

1 8. A method in accordance with Claim 1 wherein said complexing agent comprises
2 ammonium.

1 9. A method in accordance with Claim 1 wherein said oxidant and said complexing
2 agent comprise ammonium persulfate.

1 10. A method in accordance with Claim 1 wherein said slurry comprises about 0.01-
2 1.0 % (by volume) of said surfactant.

1 11. A method in accordance with Claim 1 wherein said slurry comprises at least about
2 0.2 % (by volume) of said surfactant.

1 12. A method in accordance with Claim 1 wherein said slurry comprises about 0.5 %
2 (by volume) of said surfactant.

1 13. A method in accordance with Claim 1 wherein said slurry comprises an aqueous
2 liquid vehicle containing about 6-12 % (by volume) of said abrasive, about 1.5-3 grams/liter
3 ammonium persulfate, and about 0.02- 1.0 % (by volume) of said surfactant.

1 14. A method in accordance with Claim 1 wherein said slurry comprises an aqueous
2 liquid vehicle containing about 6-12 % (by volume) of said abrasive, about 1.5-3 grams/liter
3 ammonium persulfate, and at least about 0.2 % (by volume) of said surfactant.

1 15. A method in accordance with Claim 1 wherein said slurry comprises an aqueous
2 liquid vehicle containing about 6-12 % (by volume) of said abrasive, about 1.5-3 grams/liter
3 ammonium persulfate, and about 0.5 % (by volume) of said surfactant.

1 16. A method for fabricating a thin film magnetic write head, comprising the steps of:
2 forming one or more thin film layers that comprise a hardbaked resist structure having
3 relatively low surface energy and one or more additional structures containing other materials
4 having comparatively higher surface energy;
5 simultaneously planarizing said structures using a chemical mechanical polishing
6 planarization technique and CMP slurry targeted at equaling the rate of removal of said

7 hardbaked resist structure having relatively low surface energy and said one or more additional
8 structures containing other materials of comparatively higher surface energy; and
9 said CMP slurry including a liquid vehicle, an abrasive, and a surfactant.

1 17. A method in accordance with Claim 16 wherein said other materials include
2 copper, alumina and NiFe.

1 18. A method in accordance with Claim 16 wherein said surfactant comprises a non-
2 ionic surfactant.

1 19. A method in accordance with Claim 16 wherein said surfactant comprises
2 octylphenoxypolyethoxyethanol.

1 20. A method in accordance with Claim 16 wherein said abrasive comprises silica.

1 21. A method in accordance with Claim 16 wherein said liquid vehicle comprises
2 water, said oxidant and said complexing agent.

1 22. A method in accordance with Claim 16 wherein said oxidant comprises persulfate.

1 23. A method in accordance with Claim 16 wherein said complexing agent comprises
2 ammonium.

1 24. A method in accordance with Claim 16 wherein said oxidant and said complexing
2 agent comprise ammonium persulfate.

1 25. A method in accordance with Claim 16 wherein said slurry comprises about 0.01-
2 1.0 % (by volume) of said surfactant.

1 26. A method in accordance with Claim 16 wherein said slurry comprises at least
2 about 0.2 % (by volume) of said surfactant.

1 27. A method in accordance with Claim 16 wherein said slurry comprises about 0.5 %
2 (by volume) of said surfactant.

1 28. A method in accordance with Claim 16 wherein said slurry comprises an aqueous
2 liquid vehicle containing about 6-12 % (by volume) of said abrasive, about 1.5-3 grams/liter
3 ammonium persulfate diluted in water, and about 0.02 –1.0 % (by volume) of said surfactant.

1 29. A method in accordance with Claim 16 wherein said slurry comprises an aqueous
2 liquid vehicle containing about 6-12 % (by volume) of said abrasive, about 1.5-3 grams/liter
3 ammonium persulfate, and at least about 0.2 % (by volume) of said surfactant.

1 30. A method in accordance with Claim 16 wherein said slurry comprises an aqueous
2 liquid vehicle containing about 6-12 % (by volume) of said abrasive, about 1.5-3 grams/liter
3 ammonium persulfate, and about 0.5 % (by volume) of said surfactant.

1 31. In a disk drive having a housing, a rotatable magnetic recording medium in the
2 housing, an actuator carrying an actuator arm, a suspension, and a read/write head disposed in
3 adjacent relationship with the recording medium, an improved magnetic write head having a
4 hardbaked resist structure and one or more additional structures containing other materials
5 having comparatively higher surface energy, said structures being simultaneously planarized
6 according to a planarization process comprising:

7 preparing a chemical mechanical polishing (CMP) slurry targeted at equaling the rate of
8 removal of said hardbaked resist structure and said one or more additional structures containing
9 other materials of comparatively higher surface energy;

10 said CMP slurry including a liquid vehicle containing an oxidant and a complexing agent,
11 an abrasive, and a surfactant; and

12 applying said CMP slurry to the surface of said structures and simultaneously planarizing
13 said structures using a CMP planarization technique.

1 32. A disk drive in accordance with Claim 29 wherein said slurry comprises an
2 aqueous liquid vehicle containing about 6-12 % (by volume) of said abrasive, about 1.5-3
3 grams/liter ammonium persulfate, and about 0.02-1.0 % (by volume) of said surfactant.